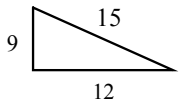
4.5 The Converse of the Pythagorean Theorem

Is the triangle a right triangle?



yes

$c^2 = a^2 + b^2$

$15^2 \; ? \; 9^2 + 12^2$

$225 = 81 + 144$

225

If $c^2 = a^2 + b^2$, then the triangle is a right triangle.

If $c^2 > a^2 + b^2$, then the triangle is an obtuse triangle.

If $c^2 < a^2 + b^2$, then the triangle is an acute triangle.

c is the longest side

What type of triangle is represented by the given sides?

Examples:

ex1 3, 5, 7 $7^2 \; ? \; 3^2 + 5^2$

Obtuse $49 \; ? \; 9 + 25$

34

ex2 7, 7, 7 $7^2 \; ? \; 7^2 + 7^2$

Acute $49 \; < \; 98$

ex3 10, 12, 6 $12^2 \; ? \; 6^2 + 10^2$

Obtuse $144 \; > \; 36 + 100$

136

Do

15, 20, 25 $25^2 \; ? \; 15^2 + 20^2$

$625 = 225 + 400$ right

9, 7, 11 $11^2 \; ? \; 9^2 + 7^2$

acute $121 \; < \; 81 + 49$

130

10, 24, 30 $30^2 \; ? \; 24^2 + 10^2$

$900 \; ? \; 576 + 100$

$900 > 676$

obtuse

$\sqrt{8}\sqrt{8} = \sqrt{64}$

5, $\sqrt{8}$, 7

$7^2 \bigcirc 5^2 + \sqrt{8}^2$

$49 \quad 25 + 8$

$49 > 33$

Obtuse

Write this!

The Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Ex:
D(1, 4)
E(3, -2)

$d = \sqrt{(1-3)^2 + (4+2)^2}$

$4 \quad +36$

$d = \sqrt{40}$

$d = 2\sqrt{10}$

40
4 10
2 2 5 2

J(-1, 7)
K(5, -1)

$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$

$\sqrt{(-1-5)^2 + (7-(-1))^2}$

$\sqrt{(-6)^2 + (8)^2}$

$36 + 64$

$\sqrt{100}$

$JK = 10$